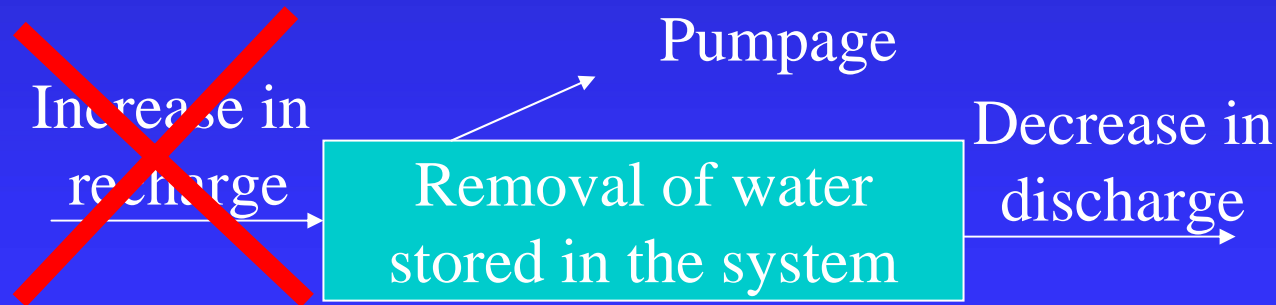
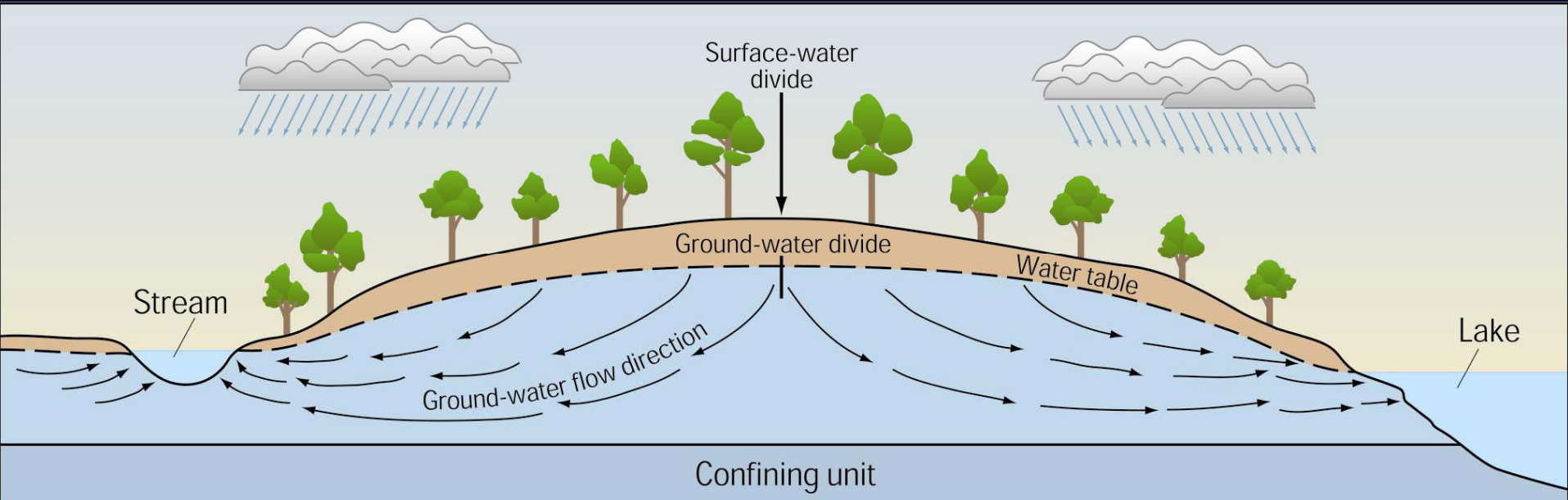


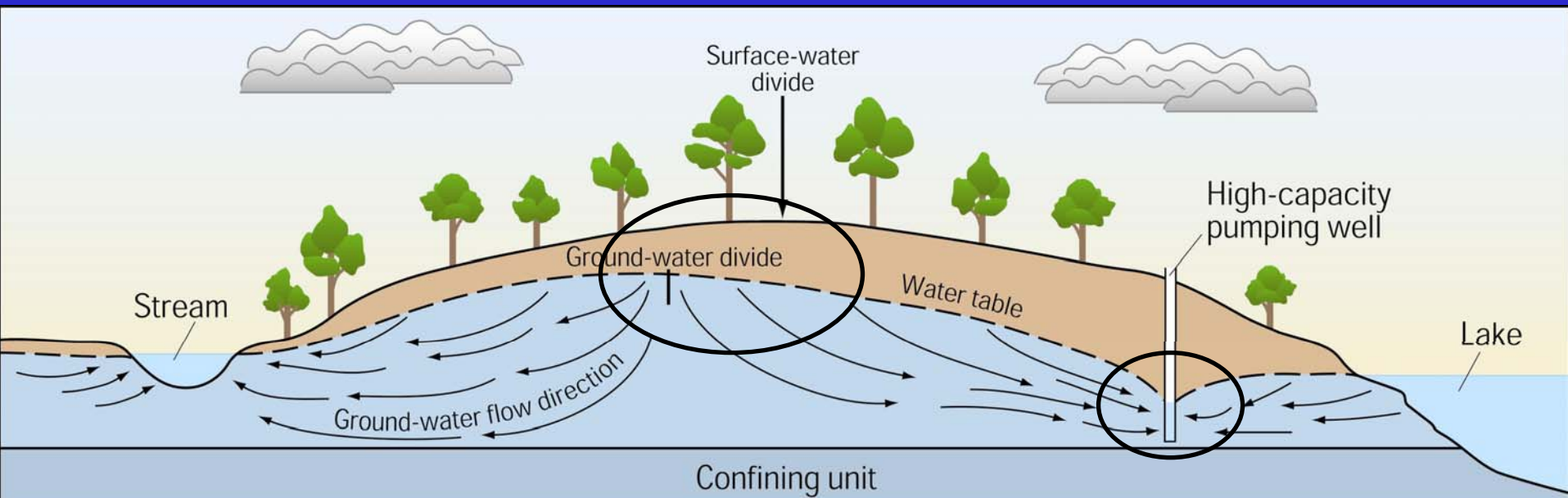
# Capture



# Natural



# Affected By Pumping





Dane county...

Stonebridge Park...





## SPRINGHAVEN PAGODA

This was built in the late 1800's to protect the natural spring water in Springhaven, the farm of Judge E. W. Keyes. Later the clear water was used by area children to make lemonade for their picnics, held in what is now Stonebridge Park.

Monona Landmarks Commission and  
Harold Homburg Family



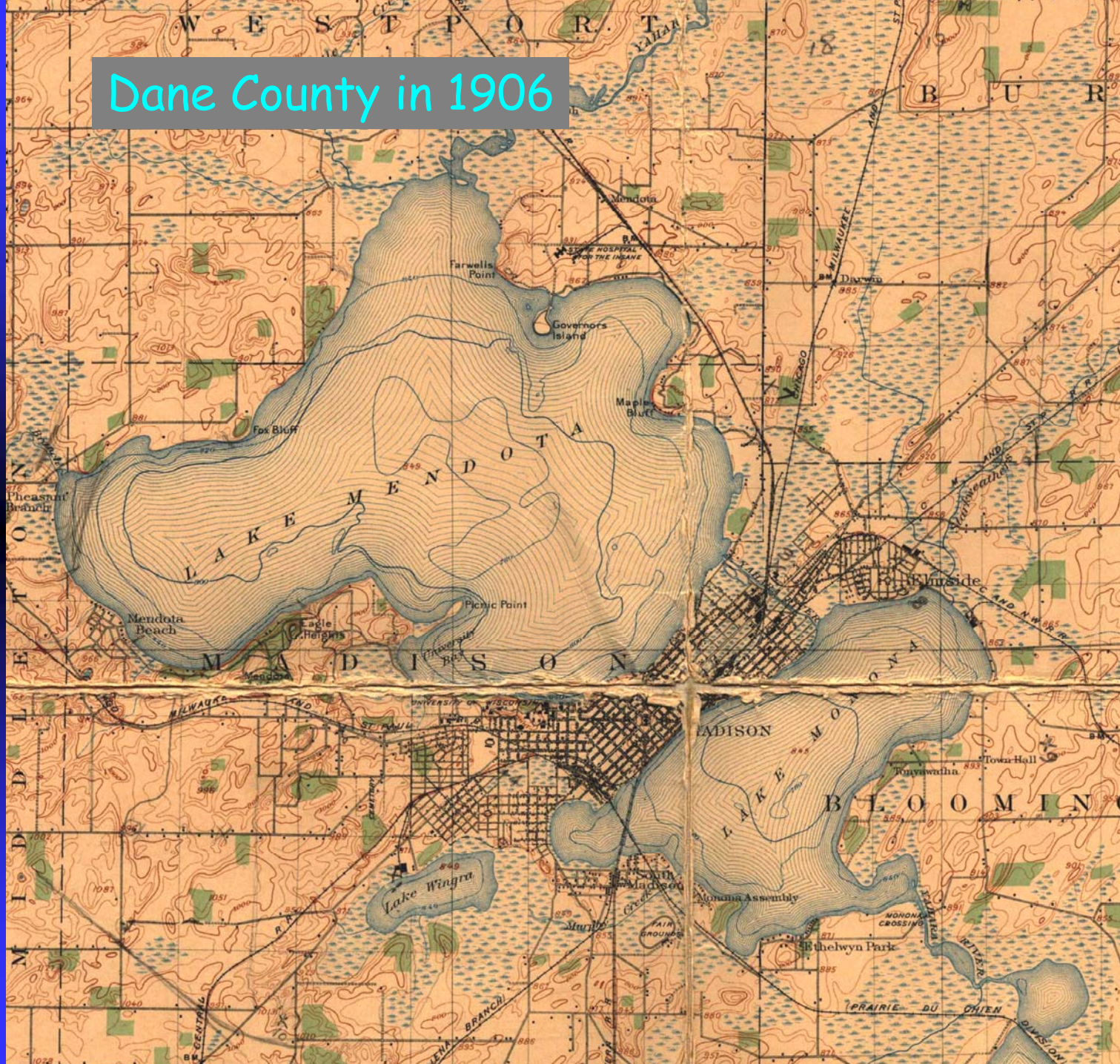
The pagoda...



Where's the  
water?

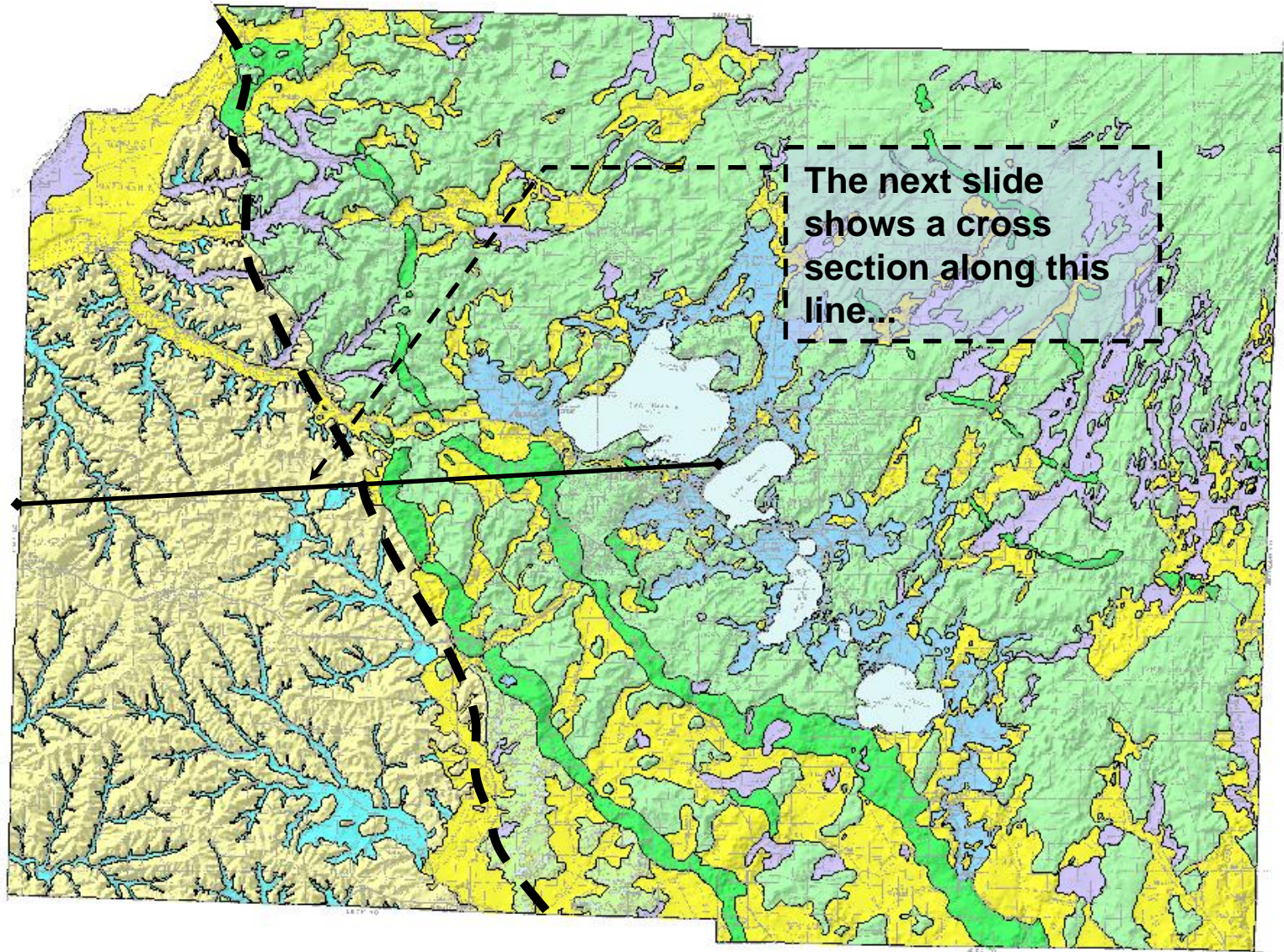


# Dane County in 1906



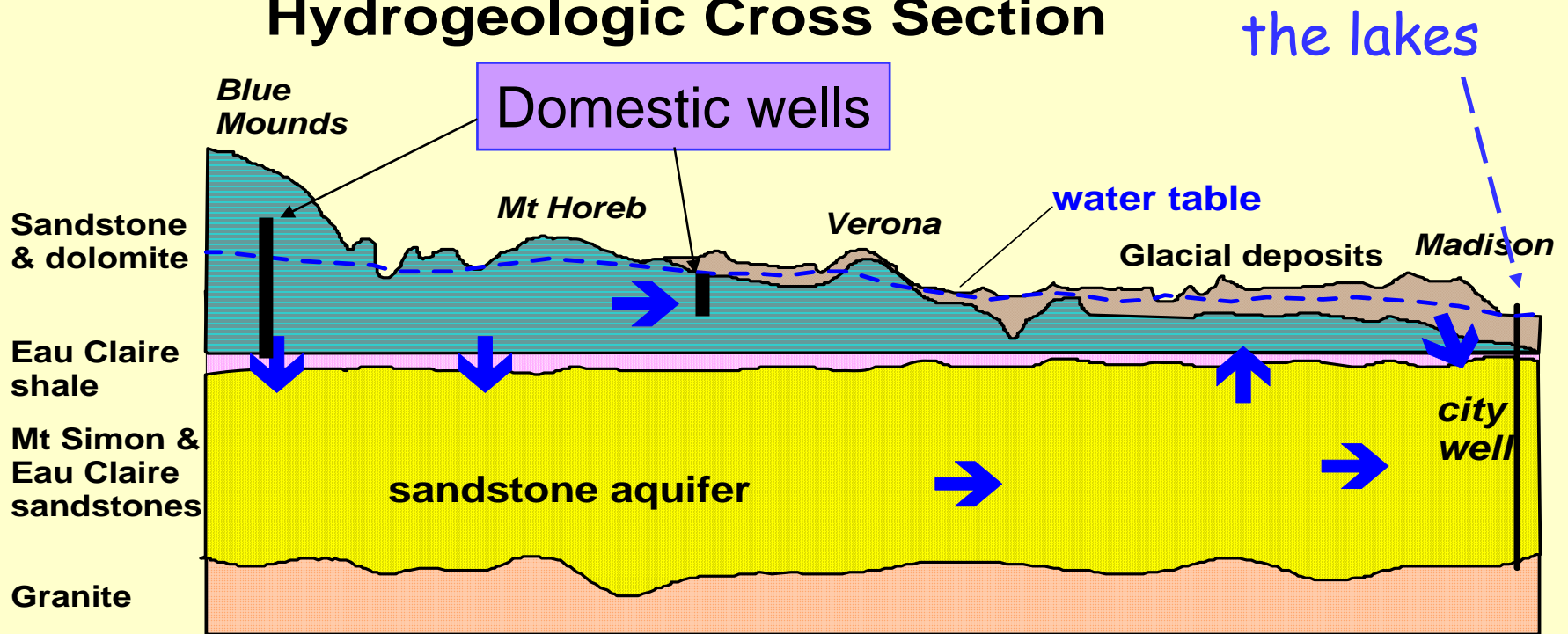


# Dane County geology...



Groundwater moves downward and laterally through Dane County's aquifers...

## Hydrogeologic Cross Section

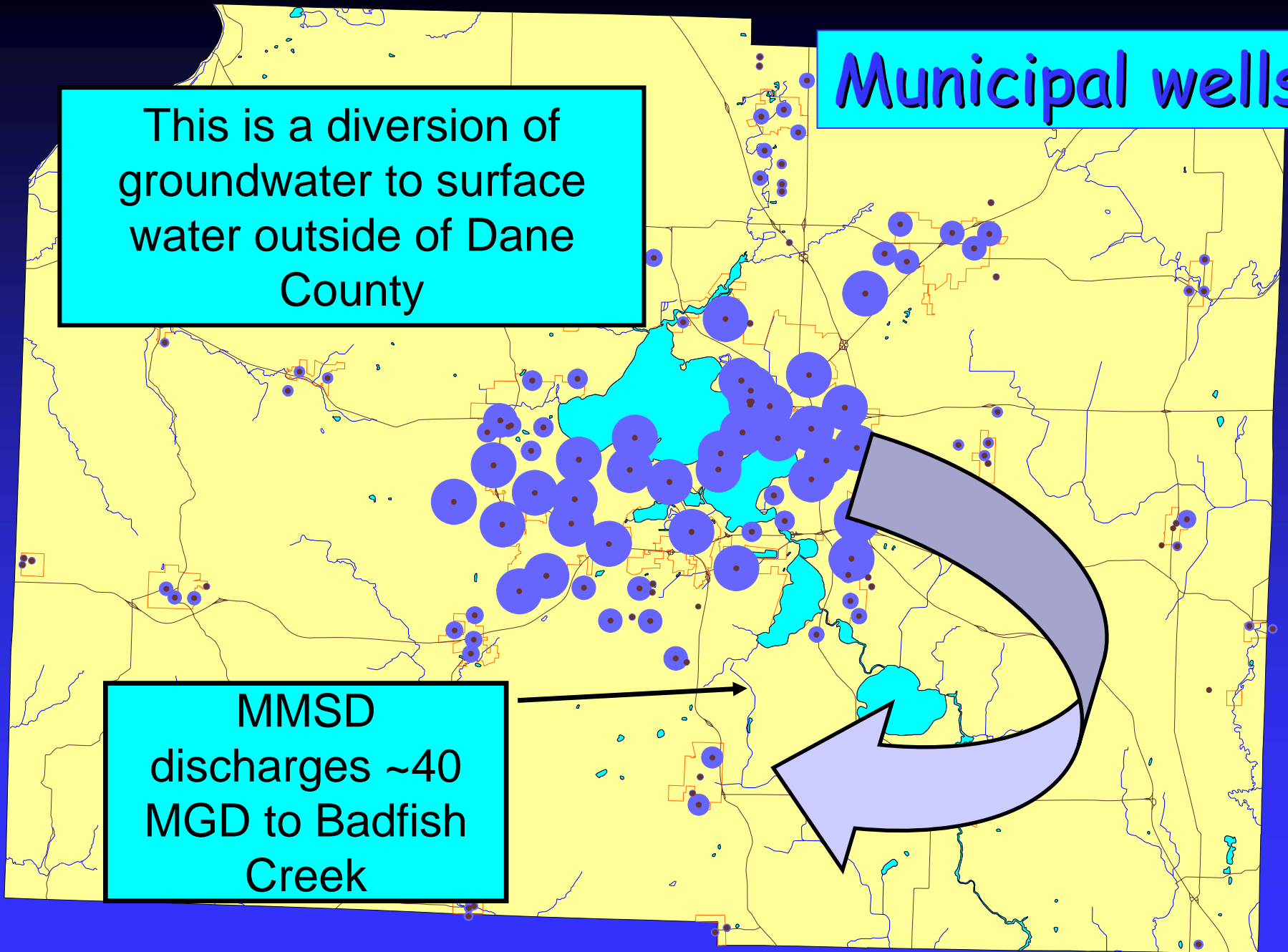




# Municipal wells

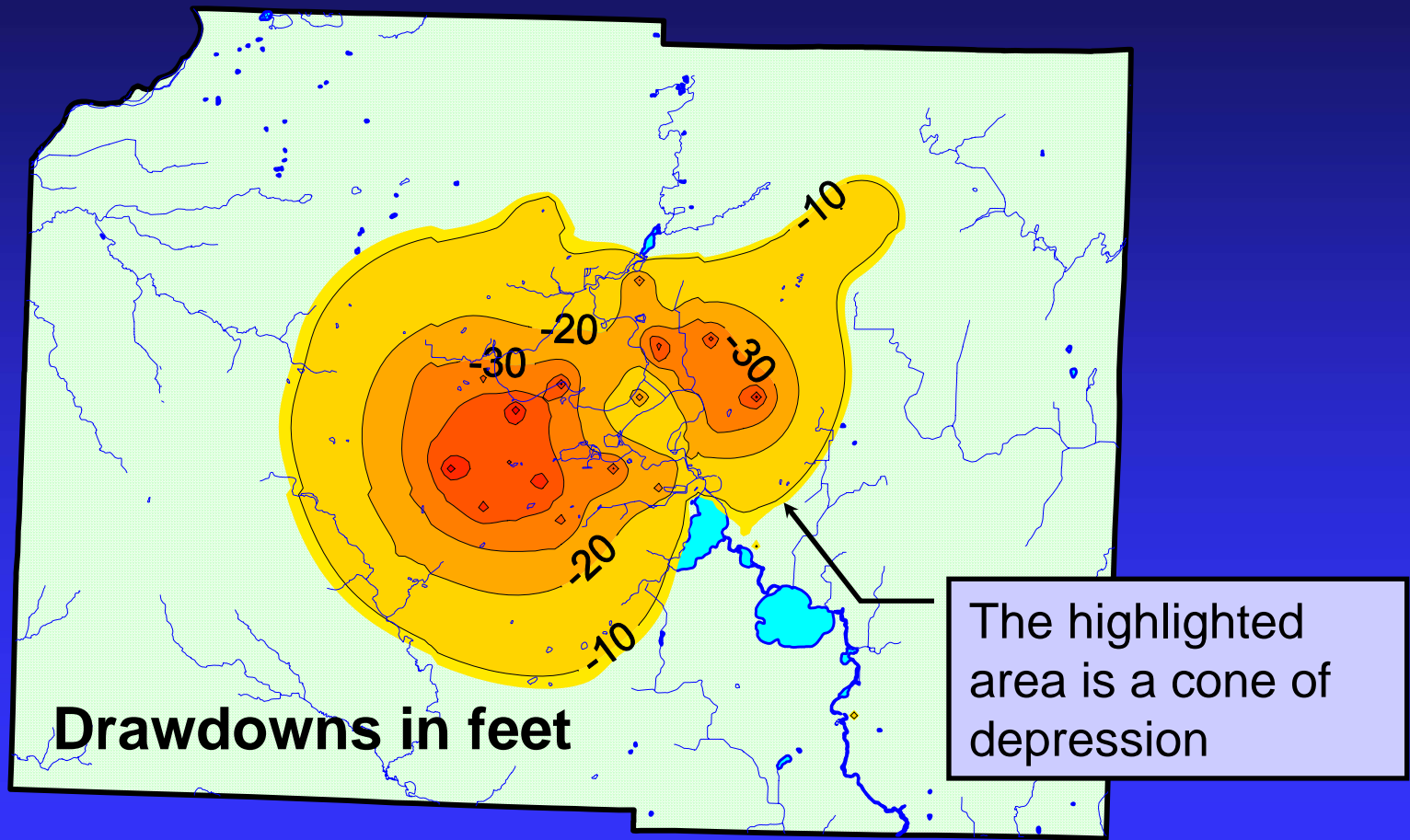
This is a diversion of  
groundwater to surface  
water outside of Dane  
County

MMSD  
discharges ~40  
MGD to Badfish  
Creek



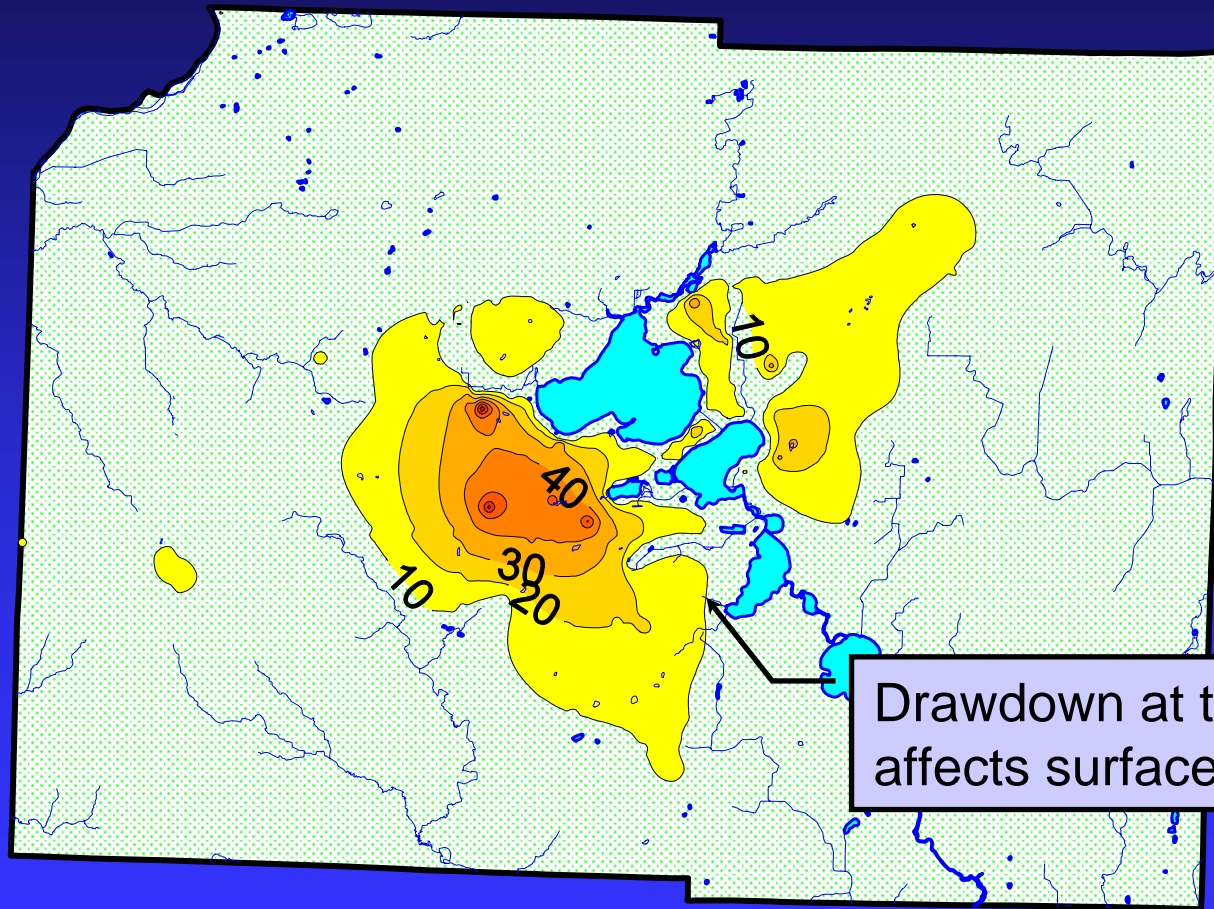


**Municipal water use in the Madison area causes significant drawdown, or lowering of water levels, in the deep sandstone aquifer...**





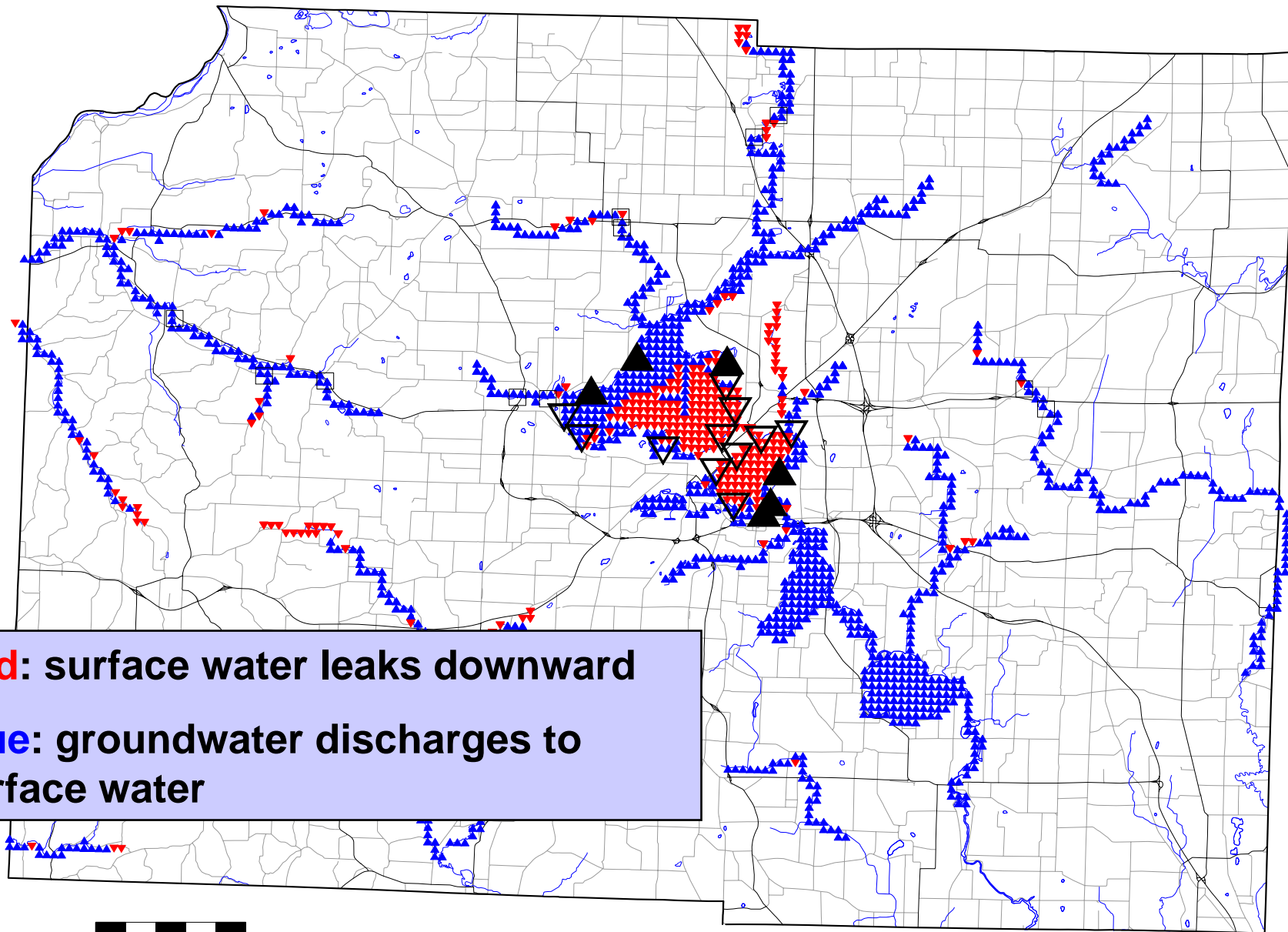
**Drawdowns in the deep aquifer can affect the water table...reducing flow in streams and water levels in wetlands**



Drawdown at the water table affects surface water features



# Groundwater discharge to lakes and streams



0 1 2 3 4 5  
miles



# Lake groundwater budgets

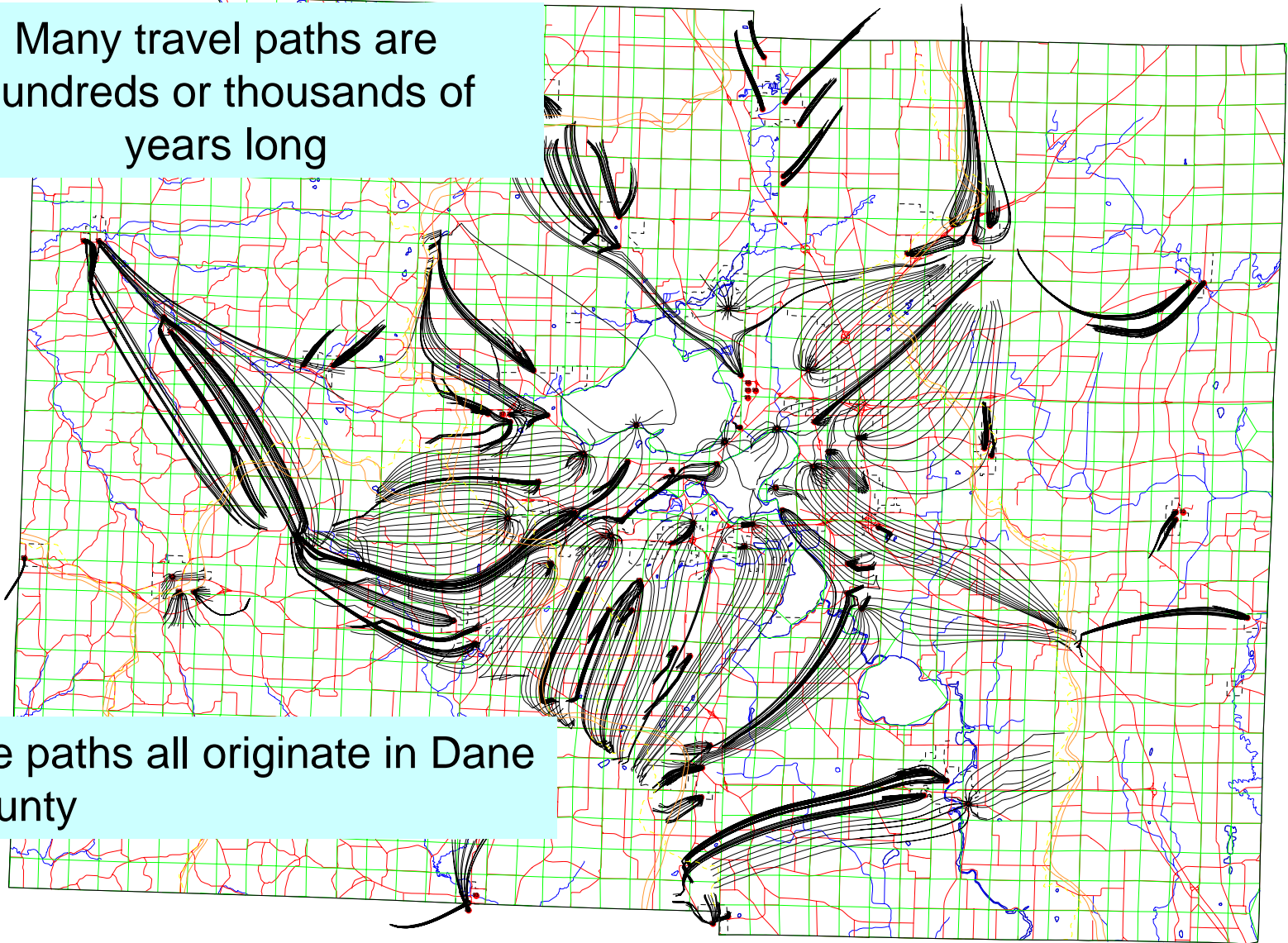
Lake	historic	current	change	pct change
	(cfs)	(cfs)	(cfs)	
Mendota	23.9	4.4	-19.5	-82%
Monona	8.7	-1.5	-10.2	-117%
Waubesa	10.3	6.5	-3.8	-37%
Kegonsa	10.2	8.8	-1.4	-14%
Wingra	3.3	1.2	-2.1	-64%
<i>total</i>	<i>56.4</i>	<i>19.4</i>	<i>-37</i>	<i>-66%</i>

Simulated changes in direct groundwater contribution to Madison Lakes resulting from onshore pumping (*note that total Dane Co pumping is about 75 CFS*)



# Pathlines to wells in Dane County form complex patterns

Many travel paths are hundreds or thousands of years long



The paths all originate in Dane County